Bond Risk Premia by Cochrane and Piazzesi

This paper studies time-varying risk premia in U.S. government bonds. The regressions of one-year excess returns are based on five forward rates available at the beginning of the period, that is, a single tent-shaped linear combination of forward rate. It predicts one-year excess returns on one to fine-year maturity bonds with R2 up to 44 percent. The return forecasting factor has a clear business cycle correlation: Expected returns are high in bad times, and low in good times, and the return-forecasting factor forecasts long-run output growth. And the return-forecasting factor is poorly related to level, slope, and curvature movements in bond yields. Therefore, it represents a source of yield curve movement not captured by most term structure models.

Estimates of the return-forecasting factor, $\overline{rx_{t+1}} = \gamma^{\intercal} f_t + \bar{\varepsilon}_{t+1}$

$p_t^{(n)}$= log price of *n*-year discount bond at time *t*.

$y_t^{(n)} \equiv -\frac{1}{n} p_t^{(n)}$. the log forward rate at time t for loans between time t+n-1 and t+n

$f_t^{(n)} \equiv p_t^{(n-1)} - p_t^{(n)}$. the log holding period return from buying an n-year bond at time t and selling it as an n-1-year bond at time t+1

$r_{t+1}^{(n)} \equiv p_{t+1}^{(n-1)} - p_t^{(n)}$. the log holding period return from buying an n-year bond at time t and selling it as an n-1-year bond at time t+1

$rx_{t+1}^{(n)} \equiv r_{t+1}^{(n)} - y_t^{(1)}$. excess log returns

$$\overline{rx_{t+1}} \equiv \frac{1}{4} \sum_{n=2}^{5} r\,x_{t+1}^{(n)}$$

$$\mathbf{rx}_{t+1} \equiv [rx_t^{(2)} \quad rx_t^{(3)} \quad rx_t^{(4)} \quad rx_t^{(5)}]^{\top}.$$

$$\mathbf{y}_t \equiv [1 \quad y_t^{(1)} \quad y_t^{(2)} \quad y_t^{(3)} \quad y_t^{(4)} \quad y_t^{(5)}]^{\top}$$

$$\mathbf{f}_t \equiv [1 \quad y_t^{(1)} \quad f_t^{(2)} \quad f_t^{(3)} \quad f_t^{(4)} \quad f_t^{(5)}]^{\top}.$$